Vitellaria paradoxa

Jøker, Dorthe

Published in:
Seed Leaflet

Publication date:
2000

Document version
Publisher's PDF, also known as Version of record

SEED LEAFLET

No. 50 December 2000

Vitellaria paradoxa Gaertn. f.

Taxonomy and nomenclature

Family: Sapotaceae

Synonyms: *Bassia parkii* G. Don, *Butyrospermum paradoxum* (Gaertn.) Hepper, *B. parkii* (G. Don) Kotschy, *B. niloticum* Kotschy, *Lucuma paradoxa* (Gaertn.) A. DC., *Mimusops capitata* Baker, *M. pachyclada* Baker.

Vernacular/common names: shea-butter tree (Eng.), karité (Fr.) Two subspecies are recognised, *paradoxa* and *nilotica*.

Distribution and habitat

Widespread in the savannah regions across Africa from Senegal to Ethiopia. Subsp. *paradoxa* occurs in a wide latitudinal belt between 5° and 15°N from Senegal to the Central African Republic. Subsp. *nilotica* is found in Sudan, Uganda, eastern Ethiopia and western Zaire. The species is rarely found outside its natural distribution range, but it has been introduced to Honduras where it is known as tango.

The two subspecies differ in altitudinal range. Subsp. *nilotica* occurs at higher altitudes (650-1600 m) than subsp. *paradoxa* which is mainly found at 100-600 m altitude, occasionally up to 1300 m. Mean annual rainfall in the area of distribution is 600-1400 mm and with 3-7 dry months (less than 50 mm rain). Subsp. *paradoxa* is generally more drought resistant than *nilotica*. Like other wide-ranging African tree species it can grow on a variety of soil types.

Uses

The main product is shea butter (karité) which is extracted from the seeds. It is one of the most affordable and widely used vegetable fats in the Sahel and plays an important role in the economy of the region. It is especially important in areas with less than 1000 mm rain/year that are not suitable for growing oil palms.

The timber is of good quality, termite resistant and generally very durable but is normally used only when the tree has passed the fruit-bearing age. Shea nut cake is increasingly used for livestock and poultry feed, and leaves and young sprouts serve as forage.

The trees are traditionally favoured and protected by farmers and has played an important role in soil and water conservation in semi-arid West Africa.

In agroforestry systems, *V. paradoxa* can be combined with many cereal crops.

Botanical description

The size of the mature tree varies from 7 to 25 m. In cultivated fields the height is typically 15-20 m. The bole is short, 3-4 m, sometimes up to 8 m with diameter less than 1 m and with thick bark that protects old trees from bush fires; slash is reddish, with white latex. Most of the leaves are borne in terminal whorls, 20-30 together. The leaves are simple, 10-25 cm long and with wavy margins.

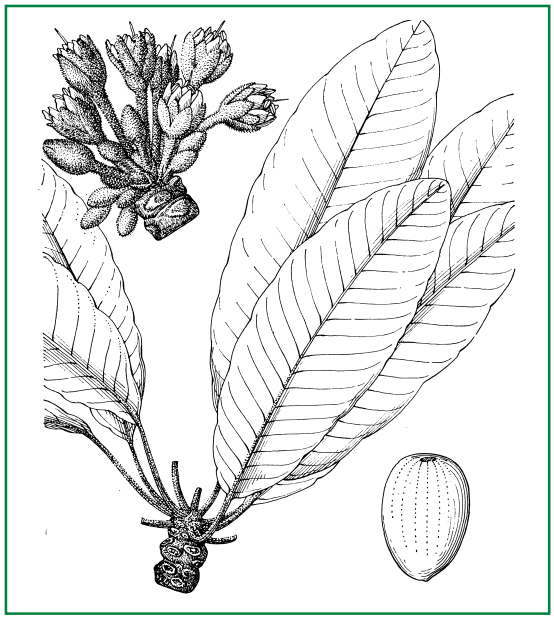
Flowers hermaphrodite, in clusters, 10-40 together, cream-yellowish and fragrant.

Fruit and seed description

Fruit: round or oval berry, 4-8 cm long, normally with one seed, occasionally 2 or 3. At maturity the fruits turn yellowish green or brown and the edible pulp becomes soft and develops a sweet or astringent taste.

Seed: up to 5 cm long; testa is shiny dark or pale brown and with a large, pale hilum almost covering one side. At 7% moisture content there are 150-300 seeds per kg.

The seed is commonly called a nut (shea nut) and the embryo is called a kernel.



Foliage, flowers and fruit of subsp. *paradoxa*. From: Flora of Tropical East Africa.

Flowering and fruiting habit

The flowers are pollinated by bees. In the Sahel, flowering occurs December-March, when the tree is

almost leafless, and the fruits mature in April-September. The phenological events are timed with the changes of seasons. Leaf fall, flushing, flowering and fruiting are noted principally as dry season events. Fruit maturity is associated with the change from dry to wet season and normally coincides with the first rains.

Fruit production typically begins when the trees are 15 years old and may continue for 300 years.

Harvest

The fruits are collected from the ground but must not be left for long on the ground as they germinate quickly. Fruit yield may vary tremendously from year to year and 10-200 kg fresh fruits/tree have been reported.

Processing and handling

After harvest the fruits are soaked in water and the pulp is removed manually.

Storage and viability

The seed is recalcitrant and does not store well.

Optimal storage conditions are 15°C at 30% moisture content. At the time of harvest the moisture content is around 40% and germination is 90-100%. The reduction in mc from 40 to 30% results in a moderate loss of viability but the storability is improved. At 15°C the seed can be stored for at least 3 months without reduction in viability. Seeds stored at 25°C showed 40% germination after 8 months. (Results are from the IPGRI/DFSC project on recalcitrant seed)

Dormancy and pretreatment

The seeds have no dormancy and need no pretreatment. However, the pulp should always be removed before sowing to improve germination.

Sowing and germination

Due to the difficulties of storage, seeds should be sown shortly after harvest. Sowing can be done in polythene pots (27 x 17 cm) or in seedbeds at 20 x 15 cm spacing. The seeds should be covered with at least 5 cm of soil. The shoot normally appears within 2 months of sowing but in subsp. *paradoxa* there may be a delay of up to 5 months.

For seedlings raised in pots there are varying recommendations as to when they should be planted out. Some say 14-24 weeks while others advise waiting for two years. Seedlings that are grown in seedbeds are normally planted out as balled (with soil around the roots) planting stock after 12 months. Bare-root stock generally gives poor results.

The seeds can also be sown directly in the field. This avoids the difficulties associated with transplanting the seedlings with their large taproots but the seeds are often heavily predated by rodents. Germination of direct sown seeds is typically only 40-50%. Regardless of planting method, wide spacing, site preparation and weeding are essential to ensure a high rate of survival.

Phytosanitary problems

The larvae of *Mussidia nigrioella* and *Ceratitis silvestrii* feed on the pulp of mature fruits.

Tree habit

Selected readings

Bonkongou, E.G. 1987. *Monographie du karité, Butyrospermum paradoxum (Gaertn f.) Hepper, espéce agroforestiere á usages multiples.* Institute de Recherche en Biologie et Ecologie Tropicale, Centre National de la Recherche Scientifique et Technologique, Ougadougou.

Booth, F.E.M. and Wickens, G.E., 1988. *Non-timber Uses of Selected Arid Zone Trees and Shrubs in Africa.* FAO Conservation Guide no. 19. FAO, Rome.

FAO, 1982. *Fruit-bearing Forest Trees*. FAO Forestry Papers no. 34. FAO, Rome.

Hall, J.B. et al., 1996. *Vitellaria paradoxa.* School of Agricultural and Forest Sciences, University of Wales, Bangor, UK.

Hemsley, J.H., 1968. *Sapotaceae*. Flora of Tropical East Africa. Royal Botanic Gardens, Kew.

von Maydell, H.-J., 1986. *Trees and Shrubs of the Sahel*. Eschborn.

THIS NOTE WAS PREPARED BY
DANIDA FOREST SEED CENTRE

Author: Dorthe Jøker

Danida Forest Seed Centre
Krogerupvej 21
DK-3050 Humlebaek
Denmark

Phone: +45-49190500
Fax: +45-49160258
Email: dfsc@sns.dk
Website: www.dfsc.dk